

EXHIBIT #3

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Applicant(s): Adrian Burian et al.
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Title: METHOD, APPARATUS AND COMPUTER PROGRAM PRODUCT
FOR PROVIDING A CAMERA BARCODE READER

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**AMENDMENT
37 C.F.R. § 1.121**

Sir:

In response to the Office Action dated March 24, 2010, please amend the above-identified application as follows:

Amendments to the Claims are reflected in the listing of claims beginning on page 2 of this paper.

Remarks begin on page 10 of this paper.

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Amendments to the Claims:

This listing of claims replaces all prior listings, and versions, of claims in the present application.

Listing of Claims:

1. (Currently Amended) A method comprising:
processing an input image for an attempt to decode the input image using a current barcode reading method, the processing including performing a correction on the input image;
determining whether the processing of the input image is successful based on a determination as to whether the correction is completed;
switching to one of a different barcode reading method or processing a new frame of the input image using the current barcode reading method in response to the processing of the input image being unsuccessful;
attempting a decode of the input image using the current barcode reading method in response to the processing of the input image being successful; and
performing a switch to the different barcode reading method in response to a failure of the attempt to decode the input image using the current barcode reading method.
2. (Original) A method according to Claim 1, wherein processing the input image comprises determining a region of interest (ROI) defining an area in which a barcode is expected.
3. (Currently Amended) A method according to Claim 2, wherein processing the input image further comprises performing the correction by correcting the ROI.
4. (Original) A method according to Claim 3, wherein correcting the ROI comprises correcting corner positions of the ROI based on a degree of overlap between the barcode and segments of a border of the ROI which are adjacent to each respective corner.

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5. (Currently Amended) A method according to Claim 2, wherein processing the input image further comprises performing the correction by performing re-sampling and geometric image correction.

6. (Original) A method according to Claim 2, wherein processing the input image comprises binarizing the ROI.

7. (Original) A method according to Claim 6, wherein performing a switch to the different barcode reading method comprises modifying the current barcode reading method by switching from a global binarization to an adaptive binarization.

8. (Original) A method according to Claim 1, further comprising performing a determination as to whether the input image includes one of a one dimensional (1D) barcode or a two dimensional (2D) barcode.

9. (Original) A method according to Claim 8, further comprising determining a type of barcode.

10. (Currently Amended) A method according to Claim 8, wherein the determination is performed based on a relationship between a first length of an object oriented in a first direction and a second length of the an object oriented in a second direction that is substantially perpendicular to the first direction.

11. (Original) A method according to Claim 1, wherein processing the input image comprises binarizing the input image.

12. (Original) A method according to Claim 11, wherein performing a switch to the different barcode reading method comprises modifying the current barcode reading method by switching from a global binarization to an adaptive binarization.

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13. (Currently Amended) A computer program product comprising at least one computer-readable storage medium having computer-readable program code portions stored therein, the computer-readable program code portions comprising:

a first executable portion for processing an input image for an attempt to decode the input image using a current barcode reading method, the processing including performing a correction on the input image;

a second executable portion for determining whether the processing of the input image is successful based on a determination as to whether the correction is completed;

a third executable portion for switching to one of a different barcode reading method or processing a new frame of the input image using the current barcode reading method in response to the processing of the input image being unsuccessful;

a fourth executable portion for attempting a decode of the input image using the current barcode reading method in response to the processing of the input image being successful; and

a fifth executable portion for performing a switch to the different barcode reading method in response to a failure of the attempt to decode the input image using the current barcode reading method.

14. (Original) A computer program product according to Claim 13, wherein the first executable portion includes instructions for determining a region of interest (ROI) defining an area in which a barcode is expected.

15. (Currently Amended) A computer program product according to Claim 14, wherein the first executable portion includes instructions for performing the correction by correcting the ROI.

16. (Original) A computer program product according to Claim 15, wherein the first executable portion includes instructions for correcting corner positions of the ROI based on a

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degree of overlap between the barcode and segments of a border of the ROI which are adjacent to each respective corner.

17. (Currently Amended) A computer program product according to Claim 14, wherein the first executable portion includes instructions for performing the correction by performing re-sampling and geometric image correction.

18. (Original) A computer program product according to Claim 14, wherein the first executable portion includes instructions for binarizing the ROI.

19. (Original) A computer program product according to Claim 18, wherein the fifth executable portion includes instructions for modifying the current barcode reading method by switching from a global binarization to an adaptive binarization.

20. (Original) A computer program product according to Claim 13, further comprising a sixth executable portion for performing a determination as to whether the input image includes one of a one dimensional (1D) barcode or a two dimensional (2D) barcode.

21. (Original) A computer program product according to Claim 20, further comprising a seventh executable portion for determining a type of barcode.

22. (Currently Amended) A computer program product according to Claim 20, wherein the sixth executable portion includes instructions for performing the determination based on a relationship between a first length of an object oriented in a first direction and a second length of the an object oriented in a second direction that is substantially perpendicular to the first direction.

23. (Original) A computer program product according to Claim 13, wherein the first executable portion includes instructions for binarizing the input image.

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24. (Original) A computer program product according to Claim 23, wherein the fifth executable portion includes instructions for modifying the current barcode reading method by switching from a global binarization to an adaptive binarization.

25. (Currently Amended) An apparatus comprising a processor and memory including computer program code, the memory and the computer program code configured to, with the processor, cause the apparatus at least processing element configured to:

process an input image for an attempt to decode the input image using a current barcode reading method, the processing including performing a correction on the input image;

determine whether the processing of the input image is successful based on a determination as to whether the correction is completed;

switch to one of a different barcode reading method or processing a new frame of the input image using the current barcode reading method in response to the processing of the input image being unsuccessful;

attempt a decode of the input image using the current barcode reading method in response to the processing of the input image being successful; and

perform a switch to the different barcode reading method in response to a failure of the attempt to decode the input image using the first barcode reading method.

26. (Currently Amended) An apparatus according to Claim 25, wherein the memory and computer program code are further configured to, with the processor, cause the apparatus further comprising a detector element which operates under control of the processing element, wherein the detector element is configured to process the input image by determining a region of interest (ROI) defining an area in which a barcode is expected.

27. (Currently Amended) An apparatus according to Claim 26, wherein the memory and computer program code are further configured to, with the processor, cause the apparatus detector element is further configured to perform the correction by correcting the ROI.

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28. (Currently Amended) An apparatus according to Claim 27, wherein the memory and computer program code are further configured to, with the processor, cause the apparatus ~~detector element is further configured~~ to correct corner positions of the ROI based on a degree of overlap between the barcode and segments of a border of the ROI which are adjacent to each respective corner.

29. (Currently Amended) An apparatus according to Claim 26, wherein the memory and computer program code are further configured to, with the processor, cause the apparatus ~~detector element is further configured~~ to process the input image via performing the correction by performing re-sampling and geometric image correction.

30. (Currently Amended) An apparatus according to Claim 26, wherein the memory and computer program code are further configured to, with the processor, cause the apparatus to ~~further comprising a binarization element which operates under the control of the processing element, wherein the binarization element is configured~~ binarize the ROI.

31. (Currently Amended) An apparatus according to Claim 30, wherein the memory and computer program code are further configured to, with the processor, cause the apparatus ~~processing element is configured~~ to perform the switch to the different barcode reading method by modifying the current barcode reading method by switching from a global binarization to an adaptive binarization.

32. (Original) An apparatus according to Claim 31, wherein global binarization comprises binarizing an entirety of the input image based on a relationship between input image values and a threshold and wherein adaptive binarization comprises dividing the input image into regions and separately binarizing the regions of the input image based on a relationship between a moving sum of region values compared to an adaptive threshold.

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33. (Currently Amended) An apparatus according to Claim 25, wherein the memory and computer program code are further configured to, with the processor, cause the apparatus further comprising a classification element operating under the control of the processing element, the classification element being configured to perform a determination as to whether the input image includes one of a one dimensional (1D) barcode or a two dimensional (2D) barcode.

34. (Currently Amended) An apparatus according to Claim 33, wherein the memory and computer program code are further configured to, with the processor, cause the apparatus classification element is configured to determine a type of barcode.

35. (Currently Amended) An apparatus according to Claim 34, wherein the memory and computer program code are further configured to, with the processor, cause the apparatus classification is configured to determine the type of barcode based on a comparison of geometric patterns within the barcode to a known specification.

36. (Currently Amended) An apparatus according to Claim 33, wherein the memory and computer program code are further configured to, with the processor, cause the apparatus classification element is configured to perform the determination based on a relationship between a first length of an object oriented in a first direction and a second length of ~~the an~~ object oriented in a second direction that is substantially perpendicular to the first direction.

37. (Currently Amended) An apparatus according to Claim 25, wherein the memory and computer program code are further configured to, with the processor, cause the apparatus to further comprising a binarization element which operates under the control of the processing element, wherein the binarization element is configured binarize the input image.

38. (Currently Amended) An apparatus according to Claim 37, wherein the memory and computer program code are further configured to, with the processor, cause the apparatus processing element is configured to perform the switch to the different barcode reading method

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by modifying the current barcode reading method by switching from a global binarization to an adaptive binarization.

39. (Original) An apparatus according to Claim 37, wherein global binarization comprises binarizing an entirety of the input image based on a relationship between input image values and a threshold and wherein adaptive binarization comprises separately binarizing two halves of the input image based on a relationship between a moving sum of input image values compared to an adaptive threshold.

40. (Original) An apparatus according to Claim 25, wherein the apparatus is embodied as a mobile terminal.

41. (Currently Amended) An apparatus comprising:

means for processing an input image for an attempt to decode the input image using a current barcode reading method, the processing including performing a correction on the input image;

means for determining whether the processing of the input image is successful based on a determination as to whether the correction is completed;

means for switching to one of a different barcode reading method or processing a new frame of the input image using the current barcode reading method in response to the processing of the input image being unsuccessful;

means for attempting a decode of the input image using the current barcode reading method in response to the processing of the input image being successful; and

means for performing a switch to the different barcode reading method in response to a failure of the attempt to decode the input image using the first barcode reading method.

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REMARKS

This amendment is submitted in reply to the Office Action dated March 24, 2010.

Claims 1-41 currently stand rejected.

Applicants have amended independent claims 1, 13, 25 and 41 for clarity. Claims 26-31 and 33-38 have been amended to improve their form. Claims 10, 22 and 36 have been amended to correct an informality. No new matter has been added by the amendment.

In light of the amendment and the remarks presented below, Applicants respectfully request reconsideration and allowance of all now-pending claims of the present application.

Claim Objections

Claims 10, 22 and 36 have drawn objection for an informality. Applicants have amended claims 10, 22 and 36 as suggested by the Examiner and therefore request withdrawal of the objections.

Claim Rejections - 35 USC § 102

Claims 1-6, 8-11, 13-18, 20-23, 25-30, 33-37, 40 and 41 currently stand rejected under 35 U.S.C. §102(b), as being unpatentable over Zhu et al. (U.S. Patent Application Publication No. 2005/0103858, hereinafter "Zhu").

Independent claims 1, 13, 25 and 41 have been amended to clarify that the processing includes performing a correction on the input image and that determining whether the processing of the input image is successful is based on a determination as to whether the correction is completed. Notably, according to the claimed invention, a switch to a different barcode reading method or processing of a new frame of the input image using the current barcode reading method is caused in response to the processing of the input image being unsuccessful, while an attempt to decode the input image is conducted if the processing is successful. Accordingly, there is not even an attempt to do any decoding according to the claimed invention until it is determined as to whether the correction is completed. Moreover, the claimed switch to a different barcode reading method or processing of a new frame is done based on whether the

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processing is successful (e.g., whether the correction is completed) and is not performed based on successful decoding.

Meanwhile, quite to the contrary, Zhu discloses that a mode shift is performed based on a successful or unsuccessful read of the image (e.g., see paragraph [0510] of Zhu. In all cases for Zhu, the determining factor for changing modes is the successful or unsuccessful reading of the barcode. Thus, Zhu fails to teach or suggest any correction that is performed as a basis for a barcode reading method switch or processing of a new frame as provided in the claimed invention. While the claimed invention provides for robust image processing and flexibility for method switching or processing of a new image based on the successful completion of a correction operation before any barcode reading is done, Zhu requires the barcode to be read, or at least the performance of an attempt to read the barcode, before any mode changes are made. Accordingly, Zhu fails to teach or suggest that the processing includes performing a correction on the input image and that determining whether the processing of the input image is successful is based on a determination as to whether the correction is completed as provided in independent claims 1, 13, 25 and 41.

Claims 2-6, 8-11, 14-18, 20-23, 26-30, 33-37 and 40 depend either directly or indirectly from respective ones of independent claims 1, 13 and 25 and thus include all the recitations of their respective independent claims. Therefore, dependent claims 2-6, 8-11, 14-18, 20-23, 26-30, 33-37 and 40 are patentable for at least those reasons given above for independent claims 1, 13 and 25.

Despite being patentable due to their dependence from patentable independent claims, yet further reasons exist for the patentability of at least some of the dependent claims. For example, claims 4, 16 and 28 each describe a correction to a region of interest (ROI) by correcting corner positions of the ROI based on a degree of overlap between the barcode and segments of a border of the ROI which are adjacent to each respective corner. The Office Action cites various paragraphs of Zhu as relating to this feature. However, the cited paragraphs of Zhu merely relate to marking the four corners of the ROI. None of the cited passages, nor any part of Zhu, provides any disclosure regarding correcting corner positions, much less making such a correction based on a degree of overlap between a barcode and segments of a border of the ROI

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which are adjacent to each respective corner as provided in claims 4, 16 and 28. Accordingly, Zhu fails to teach or suggest the additional features as provided by corresponding ones of claims 4, 16 and 28.

Accordingly, for all the reasons provided above, Applicants respectfully submit that the rejections of claims 1-6, 8-11, 13-18, 20-23, 25-30, 33-37, 40 and 41 are overcome.

Claim Rejections - 35 USC § 103

Claims 7, 12, 19, 24, 31, 32, 38 and 39 currently stand rejected under 35 U.S.C. §103(a), as being unpatentable over Zhu in view of Umeda (U.S. Patent Application Publication No. 2006/0280363).

As indicated above, Zhu fails to teach or suggest that the processing includes performing a correction on the input image and that determining whether the processing of the input image is successful is based on a determination as to whether the correction is completed as provided in independent claims 1, 13 and 25. Umeda fails to cure the above noted deficiencies of Zhu and is not cited as such. Since Zhu and Umeda each fail to teach or suggest these features, any combination of Zhu and Umeda also fails to teach or suggest such features. Independent claims 1, 13 and 25 are therefore patentable over Zhu and Umeda, alone or in combination.

Claims 7, 12, 19, 24, 31, 32, 38 and 39 depend either directly or indirectly from respective ones of independent claims 1, 13 and 25 and thus include all the recitations of their respective independent claims. Therefore, dependent claims 7, 12, 19, 24, 31, 32, 38 and 39 are patentable for at least those reasons given above for independent claims 1, 13 and 25.

Accordingly, for all the reasons provided above, Applicants respectfully submit that the rejections of claims 7, 12, 19, 24, 31, 32, 38 and 39 are overcome.


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CONCLUSION

In view of the amendment and the remarks submitted above, it is respectfully submitted that the present claims are in condition for immediate allowance. It is therefore respectfully requested that a Notice of Allowance be issued. The Examiner is encouraged to contact Applicants' undersigned attorney to resolve any remaining issues in order to expedite examination of the present invention.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,


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